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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,910	05/03/2007	Tatsuya Hayashi	2006_1422A	5620

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EXAMINER	
WAITS, ALAN B	

ART UNIT	PAPER NUMBER
3656	

NOTIFICATION DATE	DELIVERY MODE
04/11/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/590,910	HAYASHI ET AL.	
	Examiner	Art Unit	
	ALAN B. WAITS	3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,6-8,10 and 13-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,6-8,10 and 13-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. The request filed on July, 8, 2010 for a Continued Examination (RCE) is accepted and a continued prosecution application has been established. An action on the RCE follows.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi U.S. 2001/0022870 in view of Sato JP 2-278007.**

Re clm 1, Takahashi discloses a dynamic bearing device comprising a fixed-side member (2, Fig. 5), a rotational-side member (1), a thrust bearing surface (1a) formed on one of the fixed-side member and the rotational-side member, the thrust bearing surface including a dynamic pressure generating groove area having a plurality of dynamic pressure generating grooves (11) being arranged thereon, a depth of each groove in the plurality of dynamic pressure generating grooves being constant, a thrust receiving surface (2a) provided on the other one of the fixed-side member and the

rotational-side member so as to be opposed to the thrust bearing surface in an axial direction, a thrust bearing gap (3) formed between the thrust bearing surface and the thrust receiving surface, the thrust bearing gap for generating a pressure by a dynamic pressure by a dynamic pressure effect of a fluid during rotation of the rotational-side member so as to support a rotary member in an axial direction in a non-contact manner by the pressure, a reduce portion (inclined surface of 1a) having an axial width decreasing in a radially outward direction is disposed in the thrust bearing gap, the reduced portion being formed by an inclined plane disposed at the thrust bearing surface, the plurality of dynamic pressure generating grooves is disposed on the inclined plane, a pumping power of the dynamic pressure grooves is maximized in a radially outermost portion of the reduced portion, and the thrust bearing gap has a uniform portion (section of 1 between the innermost groove and 1P) with a constant width formed on an inner diameter side of the reduced portion.

Takahashi does not disclose that each pressure generating groove of the dynamic pressure generating grooves has a spiral shape, an outer-diameter end and a groove width, and for each dynamic pressure generating groove of the dynamic pressure generating grooves, the groove width increases as the dynamic pressure generating groove extends radially outwardly toward an outer periphery of the thrust bearing surface such that a largest dimension of the groove width is disposed at the outer-diameter end.

Sato teaches that each of the dynamic pressure generating grooves (6, Fig. 2) has a spiral shape, an outer-diameter end and a groove width, and the groove width

increases as the dynamic pressure generating groove extends radially outwardly toward an outer periphery of the thrust bearing surface such that a largest dimension of the groove width is disposed at the outer-diameter end.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the herring bone shape of Takahashi with the spiral shape of Sato to achieve the predictable result of providing a thrust pressure to compensate for thrust loading since both Takahashi and Sato teach thrust plates with non-planar thrust faces.

Re clm 6, Takahashi does not disclose that a ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Takahashi and provide a ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involve only routine skill in the art. *In re Aller*, 105 USPQ 223.

5. **Claims 3, 7, 10, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka JP 7-332353 in view of Nakagawa U.S. 2002/0172438 and Ouchi JP 10-269691.**

Re clm 3, Tanaka discloses a dynamic bearing device comprising a shaft member (30A, Fig. 2) having a shaft portion, a longitudinal axis and a flange portion

(10), the flange portion having an end face (36A) and an outer peripheral surface (35A), a thrust bearing portion (9) having an end face and for generating a pressure by a dynamic pressure effect of a fluid in a thrust bearing gap (between 9 and 10) between the end face of the flange portion and the end face of the thrust bearing portion, the end face of the thrust bearing portion being opposed to the end face of the flange portion so as to support the shaft member in an axial direction in a non-contact manner by the pressure, the end face of the flange portion faces the thrust bearing gap and is formed of a resin (cross-hatching of Fig. 2), the shaft member includes an outer shaft portion (33A) forming an outer peripheral face of the shaft portion and an inner shaft portion disposed on an inner periphery of the outer shaft portion, the shaft portion being configured such that when the shaft portion is disposed in a bearing sleeve (2), the outer peripheral face of the shaft portion faces a radial bearing gap (4 and 5) between the shaft portion and the bearing sleeve and the outer peripheral surface of the flange portion is disposed radially farther from the longitudinal axis of the shaft member than the outer peripheral face of the shaft portion.

Tanaka does indeed disclose a shaft portion (33A) and flange (10) which are integrally formed of a resin as well as another shaft portion (30A) which is formed of metal and an axial thickness of the resin of the shaft portion (33A) being thicker than the flange portion on an outer diameter side of the flange portion, however, Tanaka does not disclose that the outer shaft portion is formed of a metal, the inner shaft portion and the flange portion are integrally formed of a resin, and an axial thickness of the resin of

the inner shaft portion being thicker than the flange portion on an outer diameter side of the flange portion.

Nakagawa teaches a bearing shaft (51, Fig. 1) with a thrust member (62) wherein the outer shaft portion (51) is formed of metal ([0051]) and the inner shaft portion (62) and the flange portion (L-shaped protrusions at sides of 62) are integrally formed of a resin ([0058]) and an axial thickness of the resin of the inner shaft portion (center of 62) is thicker than the flange portion on an outer diameter side of the flange portion (edges of 62).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Tanaka and provide that the outer shaft portion is formed of a metal, the inner shaft portion and the flange portion are integrally formed of a resin, and an axial thickness of the resin of the inner shaft portion being thicker than the flange portion on an outer diameter side of the flange portion for the purpose of providing a light shaft which reduces the load to be applied to the thrust bearing ([0053]).

Tanaka further does not disclose that at least part of the end face of the flange portion facing the thrust bearing gap is formed as an inclined plane, the inclined plane being inclined so as to approach the opposed end face of the thrust bearing portion in a radially outward direction.

Ouchi teaches a hydrodynamic bearing device having at least part of the end face (115, Fig. 1) of the flange portion facing the thrust bearing gap (between 116 and

115) is formed as an inclined plane, the inclined plane being inclined so as to approach the opposed end face of the thrust bearing portion in a radially outward direction.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Tanaka and provide that at least part of the end face of the flange portion facing the thrust bearing gap is formed as an inclined plane, the inclined plane being inclined so as to approach the opposed end face of the thrust bearing portion in a radially outward direction for the purpose of compressing the fluid the most at the outermost circumference of the flange to provide improved thrust load support (abstract).

Re clm 7, Tanaka does not disclose that a ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Tanaka and provide a ratio is set such that $h/r \leq 0.01$ where a length of the inclined plane in a radial direction is r and a height of the inclined plane is h, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involve only routine skill in the art. *In re Aller*, 105 USPQ 223.

Re clm 10 and 14, Tanaka further discloses that a rotor magnet (27, Fig. 4) is attached to the rotational-side member and a stator coil (28) is attached to the fixed-side member.

Re clm 15, Tanaka further discloses that the inner shaft (30A) extends along substantially the entire length of the outer shaft member (34A).

6. **Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi U.S. 2001/0022870 in view of Sato JP 2-278007 as applied to claims 1 and 6 above, and further in view of Liu U.S. 6,020,644.**

Tanaka in view of Sato discloses all the claimed subject matter as described above.

Re clms 8 and 13, Takahashi in view of Sato does not disclose a motor having the dynamic bearing device, a rotor magnet attached to the rotational-side member, and a stator coil attached to the fixed-side member.

Liu teaches using a dynamic bearing device (Fig. 1) in a motor having a rotor magnet (18) attached to the rotational-side member (27) and a stator coil (14) attached to the fixed-side member.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Tanaka and provide a motor having the dynamic bearing device, a rotor magnet attached to the rotational-side member, and a stator coil attached to the fixed-side member for the purpose of preventing negative-pressure suction from occurring in a motor ([0006], Takahashi).

Response to Arguments

7. Applicant's arguments with respect to claims 1, 3, 6-8, 10 and 13-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN B. WAITS whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/
Examiner, Art Unit 3656

/Thomas R. Hannon/
Primary Examiner, Art Unit 3656